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OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, L.L.P.
1940 DUKE STREET
ALEXANDRIA, VA 22314

EXAMINER

GAMBETTA, KELLY M

ART UNIT	PAPER NUMBER
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1792

NOTIFICATION DATE	DELIVERY MODE
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ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com
oblonpat@oblon.com
jgardner@oblon.com

Office Action Summary	Application No. 10/562,868	Applicant(s) DURANDEAU ET AL.	
	Examiner KELLY GAMBETTA	Art Unit 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 November 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) 11-28 and 31 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10, 29 and 30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>12/30/2005</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

Applicant's election with traverse of claims 1-10 and 29-30 in the reply filed on 13 November 2009 is acknowledged. The traversal is on the ground(s) that the invention is not patentably distinct and examination does not put serious burden on the examiner. Though this is not required in a lack of unity requirement, the restriction is required because of serious burden. The four groups represent four separate inventions, two methods, a substrate product, and a glazing assembly that have different classification and status in the art. Therefore, their examination would present a serious burden and the inventions are patentably distinct. The applicant further argues that the special technical feature was not indicated with support from the specification and that the inventions are different embodiments. This is not found persuasive because the inventions are of entirely different categories, methods, product and an assembly. The two methods are completely different, one is a CVD process, and the other just requires a certain substrate, something that the CVD process does not even mention. They cannot be different embodiments of the same invention, but different inventions. The special technical feature is broadly interpreted as a feature the claims have in common. It is a substrate with a photocatalytic coating with at least partially crystallized titanium oxide in several forms. This is certainly supported by the specification, especially in the original claims as filed. The technical feature does not make a contribution over the prior art as taught by Boire et al.

The requirement is still deemed proper and is therefore made FINAL.

Claims 11-28 and 31 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-10 and 29-30 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation "the coating with photocatalytic properties". There is insufficient antecedent basis for this limitation in the claim.

Claim 2 recites the limitation "the mixture containing the precursor". There is insufficient antecedent basis for this limitation in the claim.

Claim 3 recites the limitation "the gas mixture". There is insufficient antecedent basis for this limitation in the claim.

Claim 4 recites the limitation "the gas mixture". There is insufficient antecedent basis for this limitation in the claim.

Claims 5 and 6 recite the limitations "the reaction and the deposition phase". There is insufficient antecedent basis for this limitation in the claim.

Claim 7 recites the limitation "the coating with photocatalytic properties". There is insufficient antecedent basis for this limitation in the claim.

Claim 8 recites the limitations "the gas mixture", "the organometallic precursor", and "one other type of mineral material". There is insufficient antecedent basis for this limitation in the claim. Claim 8, for the purposes of examination, will be interpreted to mean that the oxide is a mineral material made from a halide or metal organic precursor, as there is no claim that claim 8 depends on that includes another metal oxide.

Claim 9 recites the limitations "the coating with photocatalytic properties" and "the actual plasma discharge". There is insufficient antecedent basis for this limitation in the claim. Claim 9, for the purposes of examination, will be interpreted to mean that the deposition is plasma assisted.

Claim 10 recites the limitations "the coating with photocatalytic properties" and "the actual plasma discharge". There is insufficient antecedent basis for this limitation in the claim. Claim 10, for the purposes of examination, will be interpreted to mean that the deposition is not plasma assisted, as there is no claim that claim 10 depends upon that requires plasma.

Claim 29 recites the limitation "the metal oxide". There is insufficient antecedent basis for this limitation in the claim.

Claim 30 recites the limitation "the deposition". There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 9-10 and 29 are rejected under 35 U.S.C. 102(b) as being anticipated by Browall et al. (US 6290180).

As to claim 1, Browall et al. teaches a process for depositing, on a substrate, a coating based on semiconductor materials based on metal oxides, which are capable, under the effect of radiation of suitable wavelength, of initiating radical reactions causing the oxidation of organic substances so as to confer photocatalytic properties on said coating (abstract and column 1 lines 54-52), comprising depositing the photocatalytic coating by chemical vapor deposition in column 3 lines 50-55, for example.

As to claims 9 and 10, the coating can be deposited with or without plasma in column 3 lines 50-55. This is considered to meet these claims due to the lack of antecedent basis discussed above.

As to claim 29, the oxide deposited is titanium oxide in column 3 lines 40-45, for example.

Claims 1, 3, 7-8, 10 and 29 are rejected under 35 U.S.C. 102(b) as being anticipated by Boire et al. (US 6103363).

As to claim 1, Boire et al. teaches a process for depositing, on a substrate, a coating based on semiconductor materials based on metal oxides, which are capable, under the effect of radiation of suitable wavelength, of initiating radical reactions causing the oxidation of organic substances so as to confer photocatalytic properties on said coating (column 1 lines 55-60 and column 3 lines 45-50), comprising depositing the photocatalytic coating by chemical vapor deposition in column 2 lines 30-40, for example.

As to claim 3, Boire et al. teaches a halide type precursor for CVD in column 7 lines 45-52. It follows that an oxidizing agent or mixture of oxidizing agents must inherently be present to have an oxygen source to make titanium oxide. Chemical Vapor Deposition, by definition, is deposition after reaction of precursors in the gas phase. There must be an oxidation source present in the gas phase to react with the titanium in order to receive the titania film.

As to claim 7, Boire et al. teaches depositing a coating before the titania coating in order to give the film certain crystallinity properties in column 5 lines 20-30.

As to claim 8, Boire et al. teaches a titanium halide in column 7 lines 45-52. This is considered to anticipate this claim as the other type of mineral material has no antecedent basis as discussed above.

As to claim 10, Boire et al. teaches depositing without plasma discharge in column 2 lines 30-40. This is considered to meet this claim due to the lack of antecedent basis discussed above.

As to claim 29, the metal oxide is titanium oxide in column 5 lines 20-30, for example.

Claims 1-5, 7-9 and 29-30 are rejected under 35 U.S.C. 102(e) as being anticipated by Iacovangelo et al. (US 6890656).

As to claim 1, Iacovangelo et al. teaches a process for depositing, on a substrate, a coating based on semiconductor materials based on metal oxides, which are capable, under the effect of radiation of suitable wavelength, of initiating radical reactions causing the oxidation of organic substances so as to confer photocatalytic properties on said coating (column 1 lines 10-20, by definition of a photocatalytic coating), comprising depositing the photocatalytic coating by chemical vapor deposition in column 1 lines 10-20, for example.

As to claim 2, Iacovangelo et al. teaches depositing titanium oxide using carrier gas in a CVD process in column 5 lines 45-55. As shown in Figure 2, the carrier gas is injected into the chamber and then it becomes parallel with the precursor gas mixture in order to deposit on the substrate.

As to claim 3, Iacovangelo et al. teaches injecting an oxidizing agent into a mixture in the chamber with the titanium precursor in column 6 line 23-30, for example.

As to claim 4, some of the plasma gases contain reducing gases in column 5 lines 23-59.

As to claim 5, the reaction and deposition takes place at reduced pressure in column 7 lines 13-15.

As to claim 7, Iacovangelo et al. teaches depositing a layer that promotes adhesion of the photocatalytic layer to the substrate in column 2 lines 25-35.

As to claim 8, Iacovangelo et al. teaches a metal halide as a precursor in column 6 lines 25-30.

As to claims 9 and 30, Iacovangelo et al. teaches that a gas mixture contains a metal halide and the deposition is enhanced by a plasma source in column 6 lines 25-30 and the abstract.

As to claim 29, the metal oxide is titanium in the abstract.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

Art Unit: 1792

2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 2-8 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Browall et al. in view of Iacovangelo et al. (US 6890656).

Browall et al. is discussed above, but does not give the particulars of the CVD process used to deposit titanium oxide.

As to claim 2, Iacovangelo et al. teaches the recognized suitability of depositing titanium oxide using carrier gas in a CVD process in column 5 lines 45-55. As shown in Figure 2, the carrier gas is injected into the chamber and then it becomes parallel with the precursor gas mixture in order to deposit on the substrate. As to claim 3, Iacovangelo et al. teaches the recognized suitability of injecting an oxidizing agent into a mixture in the chamber with the titanium precursor in column 6 line 23-30, for example. As to claim 4, some of the plasma gases contain reducing gases in column 5 lines 23-

Art Unit: 1792

59. As to claim 5, the reaction and deposition takes place at reduced pressure in column 7 lines 13-15. Iacovangelo et al. teaches the recognized suitability of all of these CVD steps for depositing titanium oxide coatings for photocatalytic properties in column 1 lines 10-20. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Browall et al. to include these limitations as taught by Iacovangelo et al. as Iacovangelo et al. teaches the recognized suitability and operability of such.

As to claim 6, one of ordinary skill in the art would recognize that the pressure of the reaction chamber and the pressure during deposition and CVD reaction depends upon many factors including the size of the substrate, the pressure of the gases, the presence of vacuum pumps and what type they are, the desired mean free path of the gas molecules and certain properties of the desired coating such as roughness and cleanliness. Therefore, one of ordinary skill in the art would modify the pressure by routine experimentation based upon these variables. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to include the pressure as atmospheric, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

As to claim 7, Iacovangelo et al. teaches the recognized suitability of depositing a layer that promotes adhesion of the photocatalytic layer to the substrate in column 2 lines 25-35. As to claim 8, Iacovangelo et al. teaches a metal halide as a precursor in column 6 lines 25-30. As to claim 30, Iacovangelo et al. teaches that a gas mixture

Art Unit: 1792

contains a metal halide and the deposition is enhanced by a plasma source in column 6 lines 25-30 and the abstract. Iacovangelo et al. teaches the recognized suitability of all of these CVD steps for depositing titanium oxide coatings for photocatalytic properties in column 1 lines 10-20. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Browall et al. to include these limitations as taught by Iacovangelo et al. as Iacovangelo et al. teaches the recognized suitability and operability of such.

Claims 2, 4-6, 9 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Boire et al. in view of Iacovangelo et al. (US 6890656).

Boire et al. is discussed above, but does not give the particulars of the CVD process used to deposit titanium oxide.

As to claim 2, Iacovangelo et al. teaches the recognized suitability of depositing titanium oxide using carrier gas in a CVD process in column 5 lines 45-55. As shown in Figure 2, the carrier gas is injected into the chamber and then it becomes parallel with the precursor gas mixture in order to deposit on the substrate. As to claim 4, some of the plasma gases contain reducing gases in column 5 lines 23-59. As to claim 5, the reaction and deposition takes place at reduced pressure in column 7 lines 13-15. As to claims 9 and 30, Iacovangelo et al. teaches that a gas mixture contains a metal halide and the deposition is enhanced by a plasma source in column 6 lines 25-30 and the abstract. Iacovangelo et al. teaches the recognized suitability of all of these CVD steps for depositing titanium oxide coatings for photocatalytic properties in column 1 lines 10-

Art Unit: 1792

20. Iacovangelo et al. teaches the recognized suitability of all of these CVD steps for depositing titanium oxide coatings for photocatalytic properties in column 1 lines 10-20. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Boire et al. to include these limitations as taught by Iacovangelo et al. as Iacovangelo et al. teaches the recognized suitability and operability of such.

As to claim 6, one of ordinary skill in the art would recognize that the pressure of the reaction chamber and the pressure during deposition and CVD reaction depends upon many factors including the size of the substrate, the pressure of the gases, the presence of vacuum pumps and what type they are, the desired mean free path of the gas molecules and certain properties of the desired coating such as roughness and cleanliness. Therefore, one of ordinary skill in the art would modify the pressure by routine experimentation based upon these variables. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to include the pressure as atmospheric, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Iacovangelo et al.

Iacovangelo et al. does not teach atmospheric pressure deposition. However, one of ordinary skill in the art would recognize that the pressure of the reaction chamber and the pressure during deposition and CVD reaction depends upon many factors

Art Unit: 1792

including the size of the substrate, the pressure of the gases, the presence of vacuum pumps and what type they are, the desired mean free path of the gas molecules and certain properties of the desired coating such as roughness and cleanliness. Therefore, one of ordinary skill in the art would modify the pressure by routine experimentation based upon these variables. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to include the pressure as atmospheric, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Iacovangelo et al. in view of either *Bowell et al.* or *Boire et al.*

Iacovangelo et al. teaches plasma assisted deposition of photocatalytic titanium oxide. *Bowell et al.* and *Boire et al.* both teach the recognized suitability of depositing photocatalytic titanium oxide without plasma as discussed above. Therefore, it would have been obvious to one of ordinary skill in the art to not use plasma in Iacovangelo et al. to deposit photocatalytic titanium oxide as *Bowell et al.* and *Boire et al.* both teach the recognized suitability and operability of such.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. *Kutilek et al.* (US 2004/0202890) teaches a similar process.

Art Unit: 1792

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KELLY GAMBETTA whose telephone number is (571)272-2668. The examiner can normally be reached on Monday - Thursday 7:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Kelly M Gambetta/
Examiner
Art Unit 1792

kmg